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ABSTRACT

Objective: **To evaluate the prevalence of hazardous drinking among persons with and without HIV/AIDS attending both urban/hospital-based and rural clinics in western Kenya.**

Design: **Cross sectional survey.**

Setting: **The Moi Teaching and Referral Hospital and the Mosoriot rural health care Centre.**

Subjects: **Two hundred and ninety nine adults with and without HIV/AIDS at a teaching and referral hospital and rural health centre.**

Main Outcome Measures: **Results of the World Health Organization's Alcohol Use Disorders Identification Test (AUDIT) where a score of > 8 is indicative of hazardous alcohol consumption. Independent correlates of hazardous drinking were identified using logistic regression analysis including adjustment for common covariables.**

Results: **Study participants were relatively young (38 +/- 9 years) with 55% being male and 54% completing the AUDIT in Kiswahili. Home-made alcohol was more commonly drunk by patients attending the rural health centre while commercial beer was more commonly drunk by patients attending the teaching and referral hospital clinics. Approximately half (54%) of participants reported hazardous drinking behaviour (AUDIT score=9.9 +/- 9.4). Hazardous drinking was most prevalent among men attending the rural health centre (83% hazardous drinkers, AUDIT score=16.0 +/- 9.1). In multivariable analyses adjusting for age, sex and site of care, men remained more than nine times (odds ratio=9.3, 95% C.I.=5.1-16.9) likely to report hazardous drinking behaviour compared to women.**

Conclusions: **Hazardous drinking is common among patients with and without HIV/AIDS in western Kenya and is dramatically more common among rural men than women. Effective interventions for HIV/AIDS in this setting must include a concetrated effort to reduce hazardous drinking.**

INTRODUCTION

Alcohol abuse is a recognised, longstanding problem in sub-Saharan African countries as reflected by HIV/AIDS epidemic reports(1-3). Furthermore, alcohol abuse has marked adverse impact upon individuals with HIV/AIDS. Persons abusing alcohol are more than twice as likely to engage in sexual behaviour that increases the risk of HIV transmission(4-7). Alcohol depresses immune function, which is associated with higher viral loads and lower CD4 counts(8-10). Finally, alcohol enhances the hepatic, hematologic and neurologic toxicity of antiretroviral drugs(11-15) and decreases patients' adherence to HIV treatment regimens(16). In order to most effectively treat the HIV/AIDS epidemic in developing countries, a thorough understanding of alcohol abuse among persons with and at risk for HIV infection is necessary. However, the prevalence of hazardous drinking behaviour has not been adequately characterised among persons with and without HIV/AIDS in sub-Saharan Africa.

The Alcohol Use Disorders Identification Test (AUDIT) was developed by the World Health Organization to identify hazardous and harmful drinking(17). It has been validated in many developing countries including Kenya with sensitivities between 51% and 97% and specificities between 78% and 96% for the detection of risky drinking, alcohol misuse and alcohol dependence(17). We used the AUDIT to evaluate the prevalence of hazardous drinking among persons with and without HIV/AIDS attending both urban/hospital-based and rural clinics in western Kenya.

MATERIALS AND METHODS

After study approval was granted by both the Indiana University School of Medicine Institutional Review Board and the Moi University College of Health Sciences Institutional Research and Ethics Committee, patient surveys proceeded at two locations: the Moi Teaching and Referral Hospital (MTRH) and the Mosoriot Rural Health Centre (henceforward used interchangeably with "Mosoriot"). Moi Teaching and Referral Hospital (MTRH) is Kenya' s second National Referral Hospital, located in Eldoret in the North Rift Valley Province of Kenya, and is affiliated with Moi University College of Health Sciences. It has a catchment area that includes approximately 13 million people representing more than ten tribes. The Mosoriot Rural Health Centre is located approximately 25 km southeast of Eldoret and serves approximately 40,000 persons in surrounding communities, predominately small villages of the Nandi tribe consisting primarily of subsistence farmers with limited access to electricity and potable water.

We recruited HIV-infected patients attending HIV/AIDS clinics (HIV status determined by 2 rapid tests with discordant results confirmed by enzyme linked immunosorbent assay) at both MTRH and Mosoriot and a comparison group of HIV-negative patients attending the General Medicine clinic at MTRH. Consecutive patients presenting for appointments were invited to participate until 100 persons from each clinic were surveyed. We used the AUDIT to assess hazardous drinking (defined as an AUDIT score > 8) (17,18). Briefly, the AUDIT (described in more detail elsewhere) consists of ten questions with responses being scored zero to four giving a maximum possible score of 40(17). A research assistant (RN) administered the AUDIT in either Kiswahili or English depending on the patient's preference. Individuals asserting that they had never drunk alcohol were given an AUDIT score of zero (Question Number 1: "How often do you have a drink containing alcohol?', "never" = score of zero). In attempt to maximise confidentiality, verbal consent was accepted for participation in this voluntary survey. Names of participants were neither requested nor recorded. Information regarding age, gender, tribe and type of alcohol consumed was collected. The anonymous surveys were kept in a locked research office.

Routine, descriptive statistics were used to present summary data regarding patient demographics and drinking preferences. Proportions of hazardous alcohol consumption and mean AUDIT scores (based upon the average of the calculated, individual AUDIT scores) are presented overall and stratified by clinic. Chi-square was used for inter-clinic comparisons of categorical data and analyses of variance including non-parametric testing (Kruskill-Wallis) where appropriate was used for comparison of numerical data. Univariate and multivariable (adjusting for age, sex and clinic) logistic regression models were used in effort to understand the covariable interrelationships with hazardous drinking behaviour.

RESULTS

Of 417 consecutive patients invited to participate in the study, 299 (72%) agreed to participate and completed the AUDIT: 101 at the Mosoriot HIV/AIDS Clinic, 104 at the MTRH HIV/AIDS Clinic, and 94 at the MTRH General Medicine Clinic (Table 1). The mean age of those surveyed was 38 (+/- 9) years, and slightly more than half were men (55%). Slightly more patients completed surveys in Kiswahili (54%) than English (46%). Consistent with the demographic makeup, most of the patients surveyed at the rural health centre were members of the Nandi tribe while patients from various tribes were surveyed at MTRH. Forty-four women (forty from Mosoriot) and no men indicated that they had never drank alcohol. More patients at the rural health centre drank home-made alcohol in contrast to patients at the MTRH who mostly drunk commercial beer.

Table 1

Patients characteristics at the Moi Teaching and Referral Hospital and Mosoriot Rural Health Centre Clinics *

	Mosoriot HIV/AIDS Clinic (n=101)	MTRH HIV/AIDS Clinic (n=104)	MTRH General Med. (n=94)	Overall (n=299)
Sex (female)	71 (70)	38 (37)	25(27)	134 (45)
Age (years)	38 (+/- 8)	37 (+/- 8)	39 (+/- 10)	38 (+/-9)
Language				
Kiswahili	74 (73)	40 (39)	48 (51)	162 (54)
English	27(27)	64 (62)	46 (49)	137 (46)
Tribe				
Nandi	90 (89)	33 (32)	28 (30)	151 (51)
Kikuyu	4 (4)	18 (17)	16 (17)	38 (13)
Kisii	0	7 (7)	7 (8)	14 (5)
Luhya	4 (4)	21 (20)	10 (11)	35 (12)
Luo	3 (3)	16 (15)	16 (17)	35 (12)
Other	0	9 (9)	17 (18)	26 (9)
Alcohol †				
Beer (commercial)	31 (31)	54 (52)	37 (40)	122 (41)
Home-made	55 (54)	22 (21)	35 (38)	112 (38)
Liquor (commercial)	7 (7)	7(7)	11 (12)	25 (8)
Other	8 (8)	21 (20)	10 (11)	39 (13)

* Data are presented as mean (SD) for numerical and n (percentage) for categorical variables, † One survey did not collect type of alcohol consumption. Data here are based upon n=298

Table 2

Hazardous drinking and alcohol abuse at the Moi Teaching and Referral Hospital and Mosoriot Rural Health Centre Clinics *

	Mosoriot HIV/AIDS Clinic (n=101)	MTRH HIV/AIDS Clinic (n=104)	MTRH General Med Clinic (n=94)	Overall[1] (n=299)
Hazardous Drinking Behaviour (AUDIT score ≥ 8)				
Overall[2]	41 (40.6)	55 (52.9)	64(68.1)	160(53.5)
Female (n=134)	16 (22.5)	11 (29.0)	7 (28.0)	34 (25.4)
Male (n=165)	25 (82.6)	44 (66.7)	57 (83.3)	126 (76.4)
AUDIT Score				
Overall[3]	8.5 (+/-10.9)	9.0 (+/-8.0)	12.3 (+/-8.5)	9.9 (+/-9.4)
Female (n=133)	5.4 (+/-10.2)	5.0 (+/- 5.5)	5.3 (+/- 5.8)	5.3 (+/-8.3)
Male (n=165)[4]	16.0 (+/- 9.1)	11.3 (+/-8.4)	14.8 (+/-7.9)	13.6 (+/-8.5)

AUDIT = Alcohol Use Disorders Identification Test

* Data are presented as n (percentage) for categorical and mean (SD) for numerical variables. Intra-clinic gender proportions are provided in italics (i.e. 82.6% of men at Mosoriot HIV/AIDS clinic exhibited hazardous drinking behaviour). One survey had incomplete data and is not included in this summary.

[1] $p < 0.0001$ for all column comparisons between sex, [2] Chi-square for row comparisons among clinics significant ($p<0.05$). [3] ANOVA including non-parametric testing significant for overall clinic comparisons ($p=0.009$) with both Mosoriot and MTRH HIV/AIDS Clinics scores significantly different than MTRH General Medicine Clinic ($p < 0.05$). [4] ANOVA including non-parametric testing significant for male clinic comparisons ($p=0.01$) with MTRH HIV/AIDS Clinic score significantly different than Mosoriot HIV/AIDS and MTRH General Medicine Clinics scores ($p < 0.05$).

Slightly more than half (54%) of all subjects reported hazardous drinking behaviour (mean AUDIT score=9.9, +/- 9.4) (Table 2). Collectively, 76% of men had hazardous drinking behaviour (mean AUDIT score=13.6, +/- 8.5), which was significantly greater ($p<0.0001$) than the prevalence among women (25%), whose mean AUDIT score (5.3. +/- 8.3) was below the cut-off for hazardous drinking behaviour. There were significant differences ($p<0.05$) in hazardous drinking behaviour at the three clinics: 68% of patients attending the MTRH General Medicine Clinic exhibited hazardous drinking (mean AUDIT score = 12.3, +/- 8.5) compared to 53% at the HIV Clinic at MTRH (mean AUDIT score = 9.0, +/- 8.0) and 41% at the Mosoriot HIV Clinic (mean AUDIT score = 8.5, +/-10.9). However, the highest prevalence of hazardous drinking behaviour (83%) was among men attending the rural health centre (mean AUDIT score = 16.0, +/9.1) while the lowest prevalence (23%) was among women attending the rural health centre (mean AUDIT score = 5.4, +/- 10.1).

Examination of proportional responses for each AUDIT question demonstrates the high prevalence of hazardous drinking behaviour among men as compared to women, particularly at the rural health centre. In nearly all circumstances, higher responses (indicating a higher likelihood of hazardous drinking) are recorded for men compared to women. In univariate analyses, men were 9.5 (95% CI: 5.6-16.1) times more likely than women and older individuals (10 years, interquartile range) were 1.4 (1.2-1.6) times as likely to report hazardous drinking behaviour. Patients without HIV/AIDS attending the MTRH General Medicine Clinic had the highest odds of hazardous drinking and were 1.9 (1.1-3.4) to 3.1 (1.7-5.6) times as likely to report hazardous drinking behaviour than patients at the MTRH and Mosoriot HIV/AIDS clinics respectively. After adjusting for age, sex and clinic, men remained 9.3 (5.1-16.9) times as likely to report hazardous drinking behaviour. Age and clinic variables both became non-significant ($p \geq 0.1$) in the multivariable model suggesting male sex as the overriding factor in predicting hazardous drinking behaviour irrespective of their HIV status.

CONCLUSIONS

We found hazardous drinking behaviour to be very common among patients receiving care at three clinics (two exclusively treating adults with HIV/AIDS) in western Kenya. Overall, more than half of the study participants reported hazardous drinking behaviour. Somewhat surprisingly, we found the highest prevalence of hazardous drinking behaviour in the Moi Teaching and Referral Hospital's General Medicine Clinic (68%). However, the most striking finding was the extremely high prevalence of hazardous drinking (83%) and mean

AUDIT score (16.0 +/- 9.1) among men attending the Mosoriot Rural Health Centre HIV/AIDS clinic. Given the dangerous risks of combined hazardous alcohol abuse and HIV/AIDS co-morbidities previously outlined (increased HIV/AIDS risks sexual behaviour, depression of immune function and pharmacotoxicities), this alarmingly high prevalence is even more concerning as it relates to men with HIV/AIDS. Hence, interventions to lower the overall rate of hazardous drinking are warranted and attention should focus on men.

We found the prevalence of hazardous drinking behaviour to be substantially higher than reported in prior studies of sub-Saharan Africa (19-23). Our findings, however, are consistent with the fact that Eastern Africa, including Kenya, has the highest per-capita consumption of alcohol in Africa(24). Moreover, among persons who drink alcohol, those in Eastern Africa have the highest annual consumption of alcohol(24). The most significant limitation of our study is recall bias, present in any study involving survey methods. Alcohol consumptign is often minimised and it is possible that our statistics are an underestimate. If so, this would only increase the magnitude of our findings, particularly in men. It should be noted that we did not attempt to statistically test any causal relationship between alcohol abuse and HIV/AIDS in this study. Our only goal was to evaluate the prevalence of alcohol abuse in HIV/AIDS clinics, although an apparent positive correlation between alcohol abuse and HIV/AIDS may be hypothesised based upon the findings, and would be consistent with studies referenced in the introduction.

Limitations inherent to the AUDIT questionnaire should be considered and caution exercised in generalisation of our data. Although survey instruments such as the AUDIT have been validated in several countries including Kenya(17), they may have differing levels of validity dependent upon the differing socio-cultural contexts in which they are used. We chose the instrument because it is currently the best available, and efforts were made to minimize interviewer variability by using a research assistant fluent in English, Kiswahili and Nandi (the most widely spoken languages in this study population) to conduct the interviews. However, possible errors of ascertainment and detection as well as respondent subjectivity may influence the study results. Finally, while limitations in any such survey instrument must be considered in interpretation of results, we feel our use of the AUDIT is justified and a study strength in that the questionnaire has been used recently in other cross-sectional prevalence studies including validity and reliability assessments that have proven to be good(25-31).

Because of the known problems with the co-existence of alcohol abuse and HIV/AIDS, treating the latter must include a concerted effort to reduce hazardous drinking. Concentrated efforts in HIV/AIDS clinics in Kenya as well as other sub-Saharan Africa countries with a high prevalence of alcohol abuse are needed to identify persons at risk for hazardous drinking behaviour. Additional studies more capable of establishing the "cause-effect" correlation we observe are warranted in this setting. Yet, one must not merely intervene in clinics where patients present with HIV infection. Effective programs should be implemented at the community level to not only educate persons with HIV/AIDS about the dangers of alcohol abuse but also as a primary prevention effort to reduce subsequent HIV infection among at-risk persons with alcohol abuse.

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